Brookhaven National Laboratory

SNS

Ring and Transfer Lines Systems

O C T O B E R

MONTHLY REPORT

01 October – 31 October 2001

Performing Organization:	Brookhaven Science Associates
Location:	Brookhaven National Laboratory Upton, New York 11973-5000
Contract Period:	October 1998 – June 2006

Brookhaven National Laboratory
SNS MONTHLY PROGRESS REPORT
October 2001
Ring and Transfer Lines Systems

I. Senior Team Leader Assessment

1. TECHNICAL PROGRESS AND ACCOMPLISHMENTS

- The HEBT dipole magnet been received at BNL from Tesla. After inspection, the magnet has been repackaged and shipped to ORNL in time for DOE review.

- The bids for the Medium Field Power Supply have been opened. The contract for 65 units will be placed after BNL and ASD has final review on the units required.

- The draft handoff agreements between BNL and ORNL have been reviewed by the Ring group leaders. Specific acceptance criteria and test procedures will be generated. The total amount of dollar transfer is about 9.8 M$ and has been accomplished in October.

- The draft MOA between BNL and ORNL has been generated to delineating the BNL role and responsibility after transfer of Ring components to ORNL. This will include the period of installation, commissioning, and future operation and upgrade.

- The BNL Estimate to Complete is about 81.0 M$, a 850 K$ reduction from the May baseline. FY2002 is the peak-funding year for the ring system to commit many long term procurement of magnets, power supply, and vacuum components. The level II risk analysis indicates required contingency of about 15%.

- BNL participated in the dry run for November DOE review and also completed the final design review by the project office of the extraction system.

2. ISSUES AND ACTIONS

- None.

3. COST AND SCHEDULE STATUS

3.1 VARIANCE ANALYSIS AND PROJECT COST PERFORMANCE REPORTS

WBS 1.1.3 R&D

Variance Analysis (Cumulative to date) ($K)

BCWS	BCWP	ACWP	SV	%	CV	%
5115.4	5115.4	5038.2	0.00	0.0%	77.2	1.5%

Variance Statement: Variances are within thresholds. No analysis required.

Project Impact: None.

Corrective Action: None.

WBS 1.5 Ring and Transfer Lines

BCWS	BCWP	ACWP	SV	%	CV	%
41443.3	38670.0	37520.6	(2773.4)	-6.7%	1149.4	3.0%

Variance Statement: Cum variances are within thresholds. No analysis is required
Current period CV is driven by 1.5.3.

Project Impact: None.

Corrective Action: None

3.2 MILESTONE STATUS

WBS 1.5 and 1.1.3 have no level 0 milestones. Milestone status is listed below.

Milestones	Level 1	Level 2	Level 3	Level 4	Level 5
Project	1	2	8	13	159
FY02	0	0	0	0	15
Due in Next 30 days	0	0	0	0	1
Total Due at present	0	0	3	12	91
Made	0	0	3	11	83
Missed	0	0	0	1	8
Ahead of Schedule	0	0	0	0	0

3.3 PROJECT CRITICAL PATH ANALYSIS

The critical path for the Ring is the Diagnostic Instrumentation, specifically the BPM and IPM systems. The next area that is critical within the ring are the high field magnets, specifically the chromaticity sextupoles and the 30Q44/Q58 magnets.

II. Detail R&D Subproject Status

WBS 1.1.3 – Ring System Development

All work covered by R&D funds is essentially complete except for some material commitments.

Variance Analysis (Cumulative to date) ($K)

BCWS	BCWP	ACWP	SV	%	CV	%
5115.4	5115.4	5038.2	0.00	0.0%	77.2	1.5%

Variance Statement: Variances are within thresholds. No analysis required.

Project Impact: None.

Corrective Action: None.

III. Detail Line Item Subproject Status

WBS 1.5.1 – HEBT Systems

Phone conferences continued with Tesla during the month on the HEBT dipole magnet. The HEBT dipole 1st article was completed and tested and shipped to BNL. Upon receipt BNL found that the shipping crate was damaged so immediate turn around and shipping to ORNL had to be stopped. The magnet was unpacked, the crate was repaired, and then the magnet was shipped to ORNL. There was no apparent damage to the magnet. BNL also found that the water hoses were missing. BNL made up a set of hoses and shipped them to ORNL to expedite the testing. The first HEBT dipole stand was also sent to ORNL.

Danfysik has revised the delivery date for the quadrupole magnet and the 16CD20 corrector to January. This is three months behind schedule.

Beam tube assemblies and detail drawings for the 12cm quads are ready for checking including the relocation of HEBT collimators. The beam envelope requirements at momentum scraper dump and upstream of the injection dump were revisited and reconfirmed. Quotes for 12cm crosses and bellows have been received. Detailing of the 12cm drift spaces has resumed with bellows standardized with those for diagnostics. The 21cm arc pump tees were received. A videoconference vacuum design review is scheduled for Nov. 15th

Integration of the absorber with the vacuum chamber is continuing. A truncated collimator design is being evaluated.

Variance Analysis (Cumulative to date) ($K)

BCWS	BCWP	ACWP	SV	%	CV	%
4237.0	3884.9	3121.4	(352.1)	-8.3%	763.5	19.7%

Variance Statement: Cum CV $763.5K (19.7%) and current period CV are driven by 1.5.1.1 HEBT Magnets and Support; whereas procurement performance was acknowledged.

Project Impact: None.

Corrective Action: None.

WBS 1.5.2 – Injection Systems

The injection foil mechanism is being assembled. The design of the dump foil mechanism has begun. The cost estimate for fabrication of a spare injection septum magnet was completed and ORNL (R. Damm) gave the go ahead to start fabrication. A PCR will be submitted for this. The redesign of the dump septum magnet has begun. Design of the injection chicane magnets continues. The last chicane magnet has been sent out for bid.

The fabrication of the first article long injection kicker has continues. Design of the modificied short injection kicker continues. Several Opera magnetic analyses were carried out on the short magnet to increase field to 1000 gauss for 1.3 Gev operation. A increase of 2" thickness of ferrite in the back leg together with the 12 turn coil of 1470 amp will be needed for this change.

Many of the parts for the long injection kicker first article have been fabricated and moved to the assembly area. Magnet Coils are being made in Everson Electric Company. A taping scheme changed from one layer of kapton follow one layer of glass to interweaving kapton/glass insulation was accepted. Based on Tuan Hoang, their project manager, the first coil will be completed in the late November. From Ceramic Magnetics, the ferrite blocks will be delivered late in November. The shipping date for Ceramic vacuum chamber from Ceramaseal is 12/5/01.

Variance Analysis (Cumulative to date) ($K)

BCWS	BCWP	ACWP	SV	%	CV	%
2886.6	2488.7	2711.8	(397.9)	-13.8%	(223.1)	-8.97%

Variance Statement: Injection System cum SV of -$397.9K (-13.8%) is driven by 1.5.2.2 injection Kicker PS due to the redesign of the PS (programmable). Current period SV -$67K and CV -$218.2K are driven by 1.5.2.5 Stripped Foil and 1.5.2.2 Injection Kicker Power Supply, respectively.

Project Impact: None.

Corrective Action: None.

WBS 1.5.3 – Magnet Systems

Alignment of the ring dipole production measurement coil and stand with the dipole was completed. Fixtures to facilitate use and accurate positioning of the coil were built and installed. Calibration of the coil was completed. The first production dipole has been measured with some delay due to power supply problems at the 1.3 GeV operating current. The second magnet is on the stand.

Phone conferences continued with Tesla during the month on the 21Q40 quadrupole magnet. The first magnet was shipped and it was received by BNL at the end of the month.

Magnetic measurements of the first article 27CDM30 were completed. The testing verified the computation correction and the revised design (Moving the large sextupole windings by one coil turn). The drawings were revised, approved, and sent to Danfysik. They have been given permission to proceed with the production magnets. We await a production schedule from them.

The machining of the steel core and the coil winding for the 21CS30 and 21CO30 sextupole and octopole corrector magnets has been completed final assembly, painting, and testing is underway. New England Technicoil now estimates delivery for November 21.

The 26Q40 quadrupole pole sample was machined from steel and successfully inspected. They are proceeding with fabrication. The steel for the production magnets has been received and they have begun machining the 1st article. Delivery of first article 26Q40 quadrupole is currently scheduled for December 31, 2001. They are on schedule at this time.

Budker Institute of Nuclear Physics in Russia was awarded the contract for production of the 30Q44/30Q56 1st article magnet.

The drawings for the 41CDM30 are complete and have been checked. There will be a final design review before the drawings are released. The detailed design of the 21S26 high field sextupole continues. The design of the 36CDM30 corrector is underway.

The power supply reference magnet assembly was completed. New mounts were installed for the cable terminations that will be used in the power supply house. Also a mounting fixture was installed for the field coil that is installed in the gap. The field coil was tested at low current and then the magnet was packed up and shipped to ORNL.

The shipping container for the ring ½ cell magnet was completed and tested with a ½ cell base.

Variance Analysis (Cumulative to date) ($K)

BCWS	BCWP	ACWP	SV	%	CV	%
6028.9	6026.9	7185.9	(2.1)	0.0%	(1,159.1)	-19.2%

Variance Statement: Magnet System has a cum CV of -$1159.1K (-19.2%) and is driven by 1.5.3.1 High Field Magnets, whereas actualized purchases are greater than BCWS.
Current period SV $740.4K (470.2%) & CV $703.2K (78.3%) are driven by 1.5.3.1 High field magnet procurements, whereas BCWP is significantly greater than BCWS & ACWP

Project Impact: None.

Corrective Action: None.

WBS 1.5.4 – Power Supply Systems

Low Field Correctors: The vendor's project engineer came to BNL in October, with a prototype Low Field Corrector. Along with technical discussions, the prototype was operated with a PSI/PSC pair. One PSI/PSC pair was taken back to the factory to provide experience for the vendors to set up production testing. Among the technical changes was a input voltage change

from single phase, 120 VAC to three phase, 208 VAC. This will make the unit easier to manufacture.

Medium Range Supplies: The ratings for the medium range power supplies were changed to allow for 1.3 GeV operation, and a Best And Final Offer (BAFO) request was sent out. The BAFOs were received, a PCR was written, and the contract will be awarded before the end of November. In addition to allowing for higher energy operation, running these supplies at lower power for 1.0 GeV will enhance their reliability.

Extraction Kicker Power Supplies: A design review was held by videoconference on October 24. This covered both physics and engineering issues. Progress in the construction of the first article power supply was presented.

PSI/PSC Testing: Testing with large numbers of PSIs and PSCs continue. With the exception of the injection and extraction kickers, which have addition higher speed components, this represents the hardware used in the final system both in configuration and scope. By the time this equipment is put into service, we will have many hours of operational experience with both the hardware and the software. It will be installed as a mature system.

MPS Review: A videoconference was held October 9 to better define MPS circuitry. The MPS signal will be fully defined by the electronic AND function of the fault summary bit, the ON command, and a signal derived from an auxiliary contact of the main contactor.

Variance Analysis (Cumulative to date) ($K)

BCWS	BCWP	ACWP	SV	%	CV	%
2041.6	1021.1	786.0	(1,025.0)	-50.1%	235.1	23.0%

Variance Statement: Power Supply Systems with cum period SV -$1025K (-50.1%) and a cum period CV $235.1K (23%) are driven by 1.5.4.1 Ring Quadrupole PS Procure and 1.5.4.2 Main Ring PS, respectively. Current Period SV -$110.9K (-108%) is driven by 1.5.4.2 Ring Low Field PS whereas vendor procure under performed. Current period CV -$37.9K (-463.1%) is driven by 1.5.4.1 High Field PS.

Project Impact: None.

Corrective Action: None.

WBS 1.5.5 – Ring Vacuum System

Two complete type A halfcell chambers have been welded, leak checked and vacuum baked at 400C. The dimensions of these chambers were inspected by Survey Group. Two additional dipole chambers are air-shipped from vendor. The remaining dipole chambers are due at BNL by

end of November. All the HC pump tees have RF screens installed. The layout of the injection straight section is being worked on and the doublet vacuum chambers are being detailed. The real estate for diagnostic in the RF straight section was reviewed.

The TMP specification, SOW and system schematic have been revised reflecting the simplified version as mandated by PO. The TMP RFQ is scheduled for release in Nov. The specification and SOW for gauges and gauge controllers were finalized and the RFQ submitted to Contract and Procurement. Gauges and gauge controllers from two vendors were shipped to Jlab for measurement of analog response time.

The 1st HC chamber has been assembled on the coating set up together with the Ti cathode, gas manifolds and control, turbopumps and other coating equipment. The production coating is to start in early Nov. The coating parameter and development plan for injection kicker ceramic chambers were reviewed and confirmed by PO.

User manuals for ion pump controllers were received and reviewed. The locations of vacuum IOC racks in the service buildings were reviewed. Detailed EVAC flange drawings were received from vendor for the inspection of incoming flanges. Pressure profiles in HEBT and in the injection straight section were calculated. Two papers on TiN coating development and SNS vacuum systems were presented at IVC-15.

Variance Analysis (Cumulative to date) ($K)

BCWS	BCW	ACWP	SV	%	CV	%
2943.6	2761.4	2791.6	(182.2)	-6.2%	(30.3)	-1.1%

Variance Statement: Cum variances are within thresholds. No analysis required.
Current period CV $189.6K (65.5%) is driven by 1.5.5.4 Ring Vacuum Instr. And 1.5.5.5 Ring Vacuum Facility & Support whereas BCWP outperformed ACWP.

Project Impact: None.

Corrective Action: None.

WBS 1.5.6 – RF System

For low level RF, the problem of through put and delay in the system are under detailed study. Specifications of available DSPs are being used to find suitable candidates.

For high-level RF, connecting the power amplifier and power supply to the cavity continues.

Accelerators Physics: prepared for DOE review.

Variance Analysis (Cumulative to date) ($K)

BCWS	BCWP	ACWP	SV	%	CV	%
4955.4	4792.1	1450.4	(163.3)	-3.3%	641.7	13.4%

Variance Statement: RF Systems with cum period CV $641.7K (13.4%) is driven by 1.5.6.2 Low Level RF System whereas the actual cost of labor is less than planned. Current period SV -$164.5K (-45.8%) and CV $69.5K (37.5%) are driven by 1.5.6.1 RF High Level Instr.; and 1.5.6.1 High Level RF System, respectively.

Project Impact: None.

Corrective Action: None.

WBS 1.5.7 – Ring Diagnostics

Four 21cm Ring BPM parts were completed by the shops and are being assembled for brazing. Experiments on test samples and additional analysis indicate that a satisfactory solution has been found to thermal stresses generated by the 400C firing/cleaning. Ring analog front-end electronics design continues.

IPM magnet design has reverted from picture frame to C-magnets as a result of accessibility and beamline space considerations. Detailed magnetic design and layout continues. The possibility of replacing the MCP with a phosphor screen remains under active investigation.

BLM interface logic design to the MPS is underway. Working with the alternate source (LND Inc.) to develop an aluminum ion chamber with similar (possibly higher) sensitivity and a total collection time less than 100usec. An initial conceptual design has been prepared. Working with the control group on interface issues.

The BCM prototype board for Berkeley has been stuffed, checked out and married to the digital interface board. Initial testing has been performed and data has been transferred to the PC. Software development continues. Additional “glue logic” design is underway for the next generation PC board. Schematics are being updated for the next PC board layout revision.

Two additional carbon wires scanner actuators were received from Huntington. Parts fabrication in the shops is progressing well. Work on connector and cabling issues is underway

The 200MeV laser wire has been installed in the BNL Linac. All cabling in the tunnel is complete. Control rack equipment has been moved into place and some additional rack wiring is required. The RS232 control of the laser has been demonstrated.
Software control interface is complete and requires final testing after wiring is completed. Preparation for a separate test of radiation resistance is underway at the AGS BLIP facility. A radiachromic dosimeter has been received for the BLIP radiation tests. We are pursuing committee approval for the test.

Variance Analysis (Cumulative to date) ($K)

BCWS	BCWP	ACWP	SV	%	CV	%
4887.3	4523.4	4196.5	(363.9)	-7.4%	327.0	7.2%

Variance Statement: Cum variances are within thresholds. No analysis required. Current period SV $54.6K (36.6%) is driven by 1.5.7.3 Beam Loss monitor Detail Design whereas BCWP is greater than planned.

Project Impact: None.

Corrective Action: None.

WBS 1.5.8 – Collimation and Shielding

Work is progressing on the design of the scraper module. Drawings for the prototype module are currently in checking

Modifications to the shield suggested by the safety committee in the prototype shield are still progressing.

Variance Analysis (Cumulative to date) ($K)

BCWS	BCWP	ACWP	SV	%	CV	%
1165.8	1101.2	1156.6	(64.5)	-5.5%	(55.4)	-5.0%

Variance Statement: Cum variances are within thresholds. No analysis required. Collimation and shielding has a Current period SV of -$59.6K (92.4%) and is driven by 1.5.8.2 Movable Shielding procurement whereas BCWP is greater that planned; and current period CV -$1.3K (-25.7%) which is driven by 1.5.8.1 Ring Collimator and Shielding

Project Impact: None.

Corrective Action: None.

WBS 1.5.9 – Extraction System

Full power testing in vacuum chamber of the extraction kicker prototype is underway. A thermocouple will be installed on the ferrite magnet core to measure temperature rise of ferrite. So far there is no indication of heating of the ferrite either from the thermocouple or the vacuum read-out. A tele-conference design review was held at the end of October. The PFN oil tank and the internal parts fabrication was completed. Assembly has begun.

Variance Analysis (Cumulative to date) ($K)

BCWS	BCWP	ACWP	SV	%	CV	%
1166.1	1049.2	984.6	(117.0)	10.0%	64.5	6.1%

Variance Statement: Extraction System with a cum period SV -$117K (10%) is labor driven by 1.5.9.2.2 Charging Power Supply design and 1st Article test. Current period CV -$29.8K (-35%) is material driven by 1.5.9.1 Ring Extraction Pulsed Dipole Magnets.

Project Impact: None

Corrective Action: None.

WBS 1.5.10 – RTBT System

Videoconference on RTBT-Target vacuum interface design was attended with various pressure scenarios presented.

3D computer field analysis is being done on the 36Q85 magnet to determine the best design of the radiation resistant coils was completed. Preliminary layout and design has begun.

Due to difficulties with acquiring borated stainless steel for the construction of the first article a modified design using borated aluminum plates attached to the outside of the inner collimator cylinder was configured. This solution should have a minimal impact on the delivery date of the first article, and the cost impact should be small.
Final drawings for inner and outer collimator shielding are being prepared.

Variance Analysis (Cumulative to date) ($K)

BCWS	BCWP	ACWP	SV	%	CV	%
1843.7	1801.9	1535.7	(41.8)	-2.3%	266.2	14.8%

Variance Statement: RTBT System with a cum period CV $266.2K (14.8%) is material driven by 1.5.10.3 RTBT Vacuum Sys. and labor driven by 1.5.10.5 RTBT Collimator & Shielding whereas BCWP is greater than ACWP. Current Period CV of $106.8K (79.4%) is also driven by 1.5.10.3 RTBT Vacuum Sys. and 1.5.10.5 RTBT Collimator & Shieldin

Project Impact: None.

Corrective Action: None.

WBS 1.5.12 – Technical Support

Completed the ETC and DOE review data and presentation material. The Accelerator Physics group mainly worked in the following:

- Grouped specified and reviewed the Power supply requirement for 1.3 GeV.
- Group continued with iteration od design parameters for the smaller injection kicker magnets.
- Parameter list revised and now version #6 is official.
- Studied injection chicane issues with UAL.
- Revised the diagnostics for the transport lines and ring and fix the errors.
- Simulation optimization for the minimum beam halo on the primary scraper continued.
- Study continued on space charge limit in the presence of imperfection resonances.
- A first commissioning plan for the ring was discussed with Stuart Henderson. Detailed write-ups for the Ring transport and optics are finalized.

Variance Analysis (Cumulative to date) ($K)

BCWS	BCWP	ACWP	SV	%	CV	%
9237.8	9207.4	8899.3	(30.4)	-0.3%	308.1	3.3%

Variance Statement: Variances are within thresholds. No analysis required.

Project Impact: None.

Corrective Action: None.

WBS 1.9.1 – R&D

WBS 1.9.2.2 – Global Timing

V124s
The rev "B" V124s PCB has been received and built. The assembly has been tested and all changes have been incorporated and are working correctly. The new PCB layout for the PLL has reduced the jitter to 1 ns peak to peak. We have gone out for bids to have the modules built for engineering drawings (build to print). One bid has been received; the others are due later this week. The bid is in line with expectations. The initial request is for construction of ten pre production modules.

V123s
A bug in the V123s status register was repaired this month. The status bit incorrectly indicated if the external clock from the RF was present or not. Since the prototype units that have been distributed to the member labs use the internal crystal for operation, the bug should not affect V123s use. The bug was discovered during software testing.

Eventlink Monitor
A RHIC eventlink monitor has been modified for SNS eventlink monitor testing. The preliminary testing look good, but more in depth tests will be required.

We have also been supporting the SNS effort to have the RHIC timing system distribution components built. Our support includes evaluating substitute components for use in the equipment and providing test procedures and procurement specifications.

A prototype eventlink master and RTDL master remain set up in the SNS controls lab for driver development.

WBS 1.9.2.2 –Timing Software

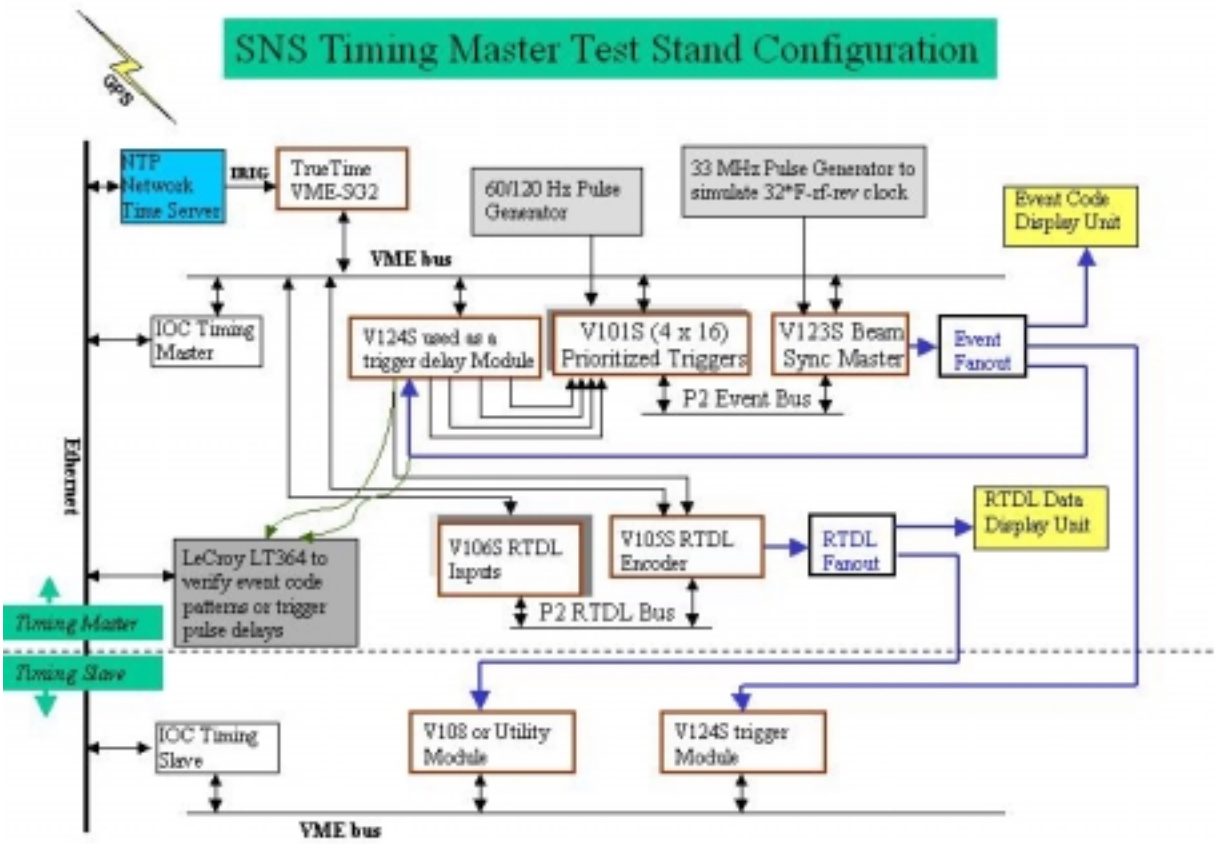
Event Timing System:

Software for the Event Timing slave (V124s) is about 85% complete. A prototype version of the software will be available next month. A final version of the software depends upon the availability of pre-production versions of the V1234s. Instead of making one large production run of V124s boards, a smaller run of a few boards is being considered. This would make the boards available to each lab sooner and allow for more extensive testing before building all the units.

The beta version of the Event Timing software has been put on the CVS repository at ORNL

A paper on the timing system is being prepared for the ICALEPCS 2001 conference being held in November.

Application software to test the functionality of the timing hardware and Epics drivers is being written.



WBS 1.9.5.1 -Ring Controls Integration

A pair of ORNL standard racks arrived and were assembled. A power supply IOC and associated hardware will be installed to check form & fit, cable routing, power connections etc.

WBS 1.9.5.2 - Power Supply Controls

PSI and PSC:

Extensive testing of the PSI and PSC hardware together with Epics software is underway. The PSI tests are nearly complete and the results are good. We have been simulating power supply dips and testing to make sure the PSIs recovery properly. It's expected that delivery of PSIs to ORNL will start in November.

Special tests are being run to check the PSCs. We have installed two test IOCs. Each has 24 PSIs connected to 4 PSCs. One system is used to check PSC using external triggers. With this system it was demonstrated that the hardware will read data at 4000Hz for several days without any obvious error, that is link, checksum error etc. Additional tests are being written to check for data errors. One test showed that there was a misunderstanding in the definition of one of the functions. Apogee made requested changes to the hardware and BNL received new FPGA source code. PSC's with the new code are being tested.

The second test IOC is used to check Epics software and PSC hardware using software triggers

PSC Software;

While the tests above are designed to check out the PSC/PSI hardware, additional checks need to be made on the Epics software which includes PSC driver, device support, Power supply application and MEDM screens.

Several changes were made to the application software to help stress test the hardware. Epics software was modified to read and write to the PSC at high rates. One test runs continuously reading data at 240Hz and writing date at 10Hz to all channels. The purpose is to ensure the hardware operates properly while mixing reads and writes at abnormally high rates.

Power Supply Application:

We continue with the objective to prepare a production version of the Power Supply Control system. The second objective to develop applications on Linux using the MvME2100 board has been met.

Previously we concentrated on building a generic power supply application. Now we are in the process of developing a real application. Configuration information has been merged with the power supply database maintained by Bob Lambiase. New tables were created for the configuration information, and database relations were defined to link information already loaded in other previously defined tables. This method allows new information to be added without impacting the existing database.

A new IOC database module, containing configurable operating parameters such as menu selection values and sample rates has been added.

Device support for the production Power Supply Controllers has been integrated into the application.

Power Supply Testing:

Danfysik and ORNL personnel were at BNL in October to test a prototype power supply with the PSI interface. Many tests were done both to check out the power supply and the interface. The vendor was given a PSC, PSI and test software to take back to the factory so testing can continue. Several problems relating to the power supply interface were identified and will be corrected at the factory before first article testing. Factory testing of the first article power supply is scheduled for January. Using SNS software and PSI hardware, the vendor will be able to check proper operation of the interface prior to the first article acceptance testing.

BNL and ORNL power supply engineers had the opportunity to evaluate the Labview software used for testing power supplies. Several changes to the application were done at their request. During the Danfysik test, it was noted there are some differences in status bit definition between vendors. A meeting will be held to reduce the differences to a minimum.

Power Supply Installation:

The location of control racks, the location of IOCs within the racks and the assignment of power supplies to particular IOCs is a task in progress. Presently we are reviewing the location of power supplies and determining the location of IOCs ot minimizes the cabling between IOC and supplies.

WBS 1.9.5.3 – Diagnostics

BLM:

A new Postdoc has joined the group and has started to work on the BLM system. Computers and IOC have been setup and testing of a VMIC ADC board is underway. There was a short design meeting to review some of the design options. One question is the reliability requirements for the BLM system.

Laser Wire:

PC software for motor, scope and laser control was completed early in the month and demonstrated in the lab. All the equipment was moved to the Linac. New wiring from hardware to computer was installed. Now personnel are waiting for tunnel access to the equipment to connect all the equipment and test the controls, software, wiring etc.

WBS 1.9.5.4 - Vacuum

A users manual for the Varian Dual Controller was received. The driver design work will start shortly. The first task is to study the manual and acquire RS-485 hardware and software. A

serial port driver will be required. The schedule for software development will depend upon the delivery date of a controller.

The controls group is working with the Vacuum group to assign the IOC's to appropriate racks near the Vacuum equipment.

WBS 1.9.5.5 - Application Software

Prepared a paper for the ICALEPCS conference. "A prototype of the UAL 2.0 application toolkit".

SNS Ring Simulation Environment:

The negative SBEND problem in the TEAPOT++ module for including injection bumps in the SNS was fixed.

Ported the ZLIB++ module to the gcc 3.0 compiler and added the C++ documentation.

WBS 1.9.5.6 – RF

An EPICS demo system has been setup and installed in the building 911 RF lab. A network connection to the SNS VLAN was installed in the RF lab. The system is now available to the RF group. Controls development work on the RF systems is not expected to start for several months, that is until the High Level RF PLC interface definitions are complete or until Low Level RF VME boards are received.

IV. Earned Value Reports and Charts

U.S. DEPARTMENT OF ENERGY

COST PERFORMANCE REPORT - WORK BREAKDOWN STRUCTURE (FORMAT 1)

PROJECT TITLE: SPALLATION NEUTRON SOURCE	**REPORTING PERIOD:** 1-Oct-01 thru 31-Oct-01	**PROJECT NUMBER:** 99-E-334
		START DATE: October 1998
PARTICIPANT NAME AND ADDRESS: Brookhaven National Laboratory, Brookhaven, NY	**BCWS PLAN DATE:** October 1999	**COMPLETION DATE:** November 2006

WORK BREAKDOWN STRUCTURE	CURRENT PERIOD					CUMULATIVE TO DATE					AT COMPLETION		
	Budgeted Cost		Actual Cost	Variance		Budgeted Cost		Actual Cost	Variance				
	Work Scheduled	Work Performed	of Work Performed	Schedule	Cost	Work Scheduled	Work Performed	of Work Performed	Schedule	Cost	Budgeted	Revised Estimate	Variance
1.1.3 Rings System Development	0.0	0.0	(35.8)	0.0	35.8	5,115.415	5,115.415	5,038.238	0.0	77.2	5,115		
1.5 Ring & Transfer Line System	2,040.3	2,299.3	1,206.2	259.1	1,093.1	41,443.324	38,669.956	37,520.555	(2,773.4)	1,149.4	123,312		
1.5.1 HEBT (High Energy Beam Transport) Systems	388.5	266.0	49.5	(122.6)	216.4	4,236.960	3,884.894	3,121.385	(352.1)	763.5	10,639		
1.5.2 Injection Systems	28.7	(38.4)	179.8	(67.0)	(218.2)	2,886.602	2,488.660	2,711.784	(397.9)	(223.1)	9,233		
1.5.3 Magnet Systems	157.5	897.84	194.7	740.4	703.2	6,028.919	6,026.797	7,185.946	(2.1)	(1,159.1)	16,357		
1.5.4 Power Supply System	102.7	(8.2)	29.7	(110.9)	(37.9)	2,046.086	1,021.121	785.986	(1,025.0)	235.1	5,779		
1.5.5 Vacuum System	234.7	289.3	99.7	54.6	189.6	2,943.601	2,761.361	2,791.614	(182.2)	(30.3)	11,404		
1.5.6 RF System	359.2	194.7	125.2	(164.5)	69.5	4,955.447	4,792.127	4,150.423	(163.3)	641.7	13,049		
1.5.7 Ring Systems Diagnostic Instrumentation	148.9	203.4	169.5	54.6	33.9	4,887.291	4,523.440	4,196.458	(363.9)	327.0	16,102		
1.5.8 Collimation and Shielding	64.5	4.9	6.2	(59.6)	(1.3)	1,165.754	1,101.228	1,156.579	(64.5)	(55.4)	2,740		
1.5.9 Extraction System	111.2	85.0	114.8	(26.1)	(29.8)	1,166.149	1,049.154	984.640	(117.0)	64.5	5,965		
1.5.10 RTBT (Ring to Target Beam Transport) System	139.3	134.4	27.6	(4.9)	106.8	1,843.652	1,801.877	1,535.703	(41.8)	266.2	8,099		
1.5.11 Cable	4.4	0.0	0.0	(4.4)	0.0	45.029	11.911	0.749	(33.1)	11.2	2,817		
1.5.12 Technical Support	300.8	270.4	209.5	(30.4)	60.9	9,237.834	9,207.386	8,899.288	(30.4)	308.1	21,127		
WBS SUBTOTAL	2,040.3	2,299.3	1,170.4	259.1	1,129.0	46,558.7	43,785.4	42,558.8	(2,773.4)	1,226.6	128,428		
UNDISTRIBUTED BUDGET													
SUBTOTAL	2,040.3		1,170.4			46,558.7		42,558.8			128,428		
MANAGEMENT RESERVE													
TOTAL	2,040.3		1,170.4			46,558.7		42,558.8			128,428		

RECONCILIATION TO CONTRACT BUDGET BASE

DOLLARS EXPRESSED IN:	SIGNATURE OF PARTICIPANT'S PROJECT DIRECTOR:	DATE:
THOUSANDS	Bill Weng	November 28, 2001